AMENDMENTS TO THE CLAIMS

1. (Currently amended) A product for interfacing with a plurality of file-systems and block devices, said product creating and handling multiple snapshot instances in a computer storage system, the product implementing the process of:

identifying one or more blocks being used;

creating a snapshot record for each of said blocks on a base volume at a first time, wherein creating a snapshot record at the first time further comprises:

(1) suspending all of the write operations issued from file systems;

(2) identifying the blocks called by file systems;

(3) creating a snapshot record for each of the identified blocks;

(4) resuming the write operations issued from the file systems to the said blocks on said base volume

(5) counting the number of write operations being taken to the said block; and

(6) creating a binding of a copy-on-write block associated with the said block as well as the associated snapshot instances;

performing snapshot management functions to said blocks on said base volume;

handling snapshot records of said blocks on said base volume at a second time; and

allowing writing of data on said blocks to free space on said base volume.

2. (Cancelled)

3. (Cancelled)

4. (Original) The product of Claim 1, wherein creating a new snapshot instance comprises:

allocating an unused bit in a counting bitmap to identify the created snapshot instance; and

updating all of the allocated bits in the counting bitmap.

5. (Original) The product of Claim 1, wherein handling a snapshot record comprises:

suspending the write operation to blocks on base volume;

updating a counting bitmap;

checking the snapshot record to determine whether a copy-on-write operation is needed;

allocating free space on the base volume; and

performing the copy-on-write operation to the allocated block in free space when a copy-on-write is needed; otherwise, resuming the write operation to blocks on base volume.

6. (Original) The product of Claim 5, wherein allocating free space on the base volume comprises:

selecting an unused block on the base volume;

identifying the selected block in the snapshot record;

updating block allocation bitmap and snapshot block allocation bitmap of file system.

7. (Original) The product of Claim 6, wherein allocating free space for storing snapshot records comprises:

dynamic allocating one or more free blocks when size of snapshot record grows and freeing allocating blocks when size of snapshot record shrinks.

8. (Original) The product of Claim 6, wherein freeing blocks on the base volume further comprises:

marking the freed blocks as unused ones in both the block allocation bitmap and the snapshot block allocation bitmap of file system.

9. (Original) The product of Claim 1, wherein handling a snapshot instance created on the base volume during a delete operation comprises:

suspending all write operations issued from file system to the base volume;

identifying a counting bit corresponding to the said snapshot instance;

removing unused record of write operation to its associated block; finding all copy-on-write blocks associated with said snapshot instance;

freeing said copy-on-write blocks when they have no other snapshot instance to associate with; otherwise, resuming all pending write operations issued from file system to base volume.

10. (Original) The product of Claim 1, wherein handling a snapshot instance being created on the base volume during a storing operation further comprises:

restraining all write operations issued from file system to said base volume;

identifying all copy-on-write blocks associated with said snapshot instance;

exchanging data on copy-on-write blocks with data on the blocks associated with the snapshot instance;

updating the state of snapshot record;

updating the block allocation bitmap and snapshot block allocation bitmap of file system;

restarting the write operations of the file system to the base volume.

11. (Original) The product of Claim 10, wherein updating the block allocation bitmap and snapshot block allocation bitmap of a file system comprises:

freeing all blocks being marked as used in the snapshot block allocation bitmap;

marking blocks which are currently used by the product as used in both bitmaps.